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(54) **CAR WASH WITH INTEGRATED VEHICLE DIAGNOSTICS**

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G07C 5/08	(2006.01)
G06Q 20/32	(2012.01)
B60S 3/00	(2006.01)

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CPC ***G07C 5/006*** (2013.01); ***B60S 3/00*** (2013.01); ***G06Q 20/322*** (2013.01); ***G07C 5/008*** (2013.01); ***G07C 5/0825*** (2013.01); *G07C 2205/02* (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

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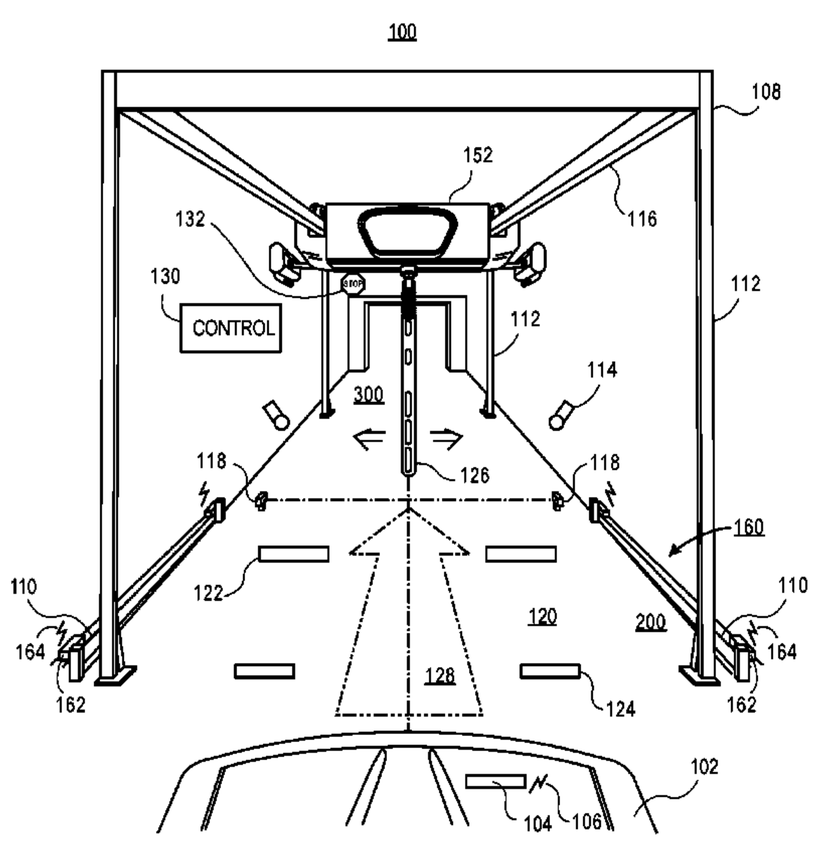
(57) **ABSTRACT**

A car wash with integrated diagnostic functions is provided that includes the ability to wash and dry a connected vehicle and perform various diagnostic functions. The various diagnostic functions such as tread depth measurement, measuring tire pressures, performing safety inspection, emissions testing and performing vehicle diagnostics and the like may be performed while the connected vehicle is at the car wash. The results of the diagnostic tests may be provided to the driver at the end of the car wash via the driver's wireless computing device.

19 Claims, 3 Drawing Sheets



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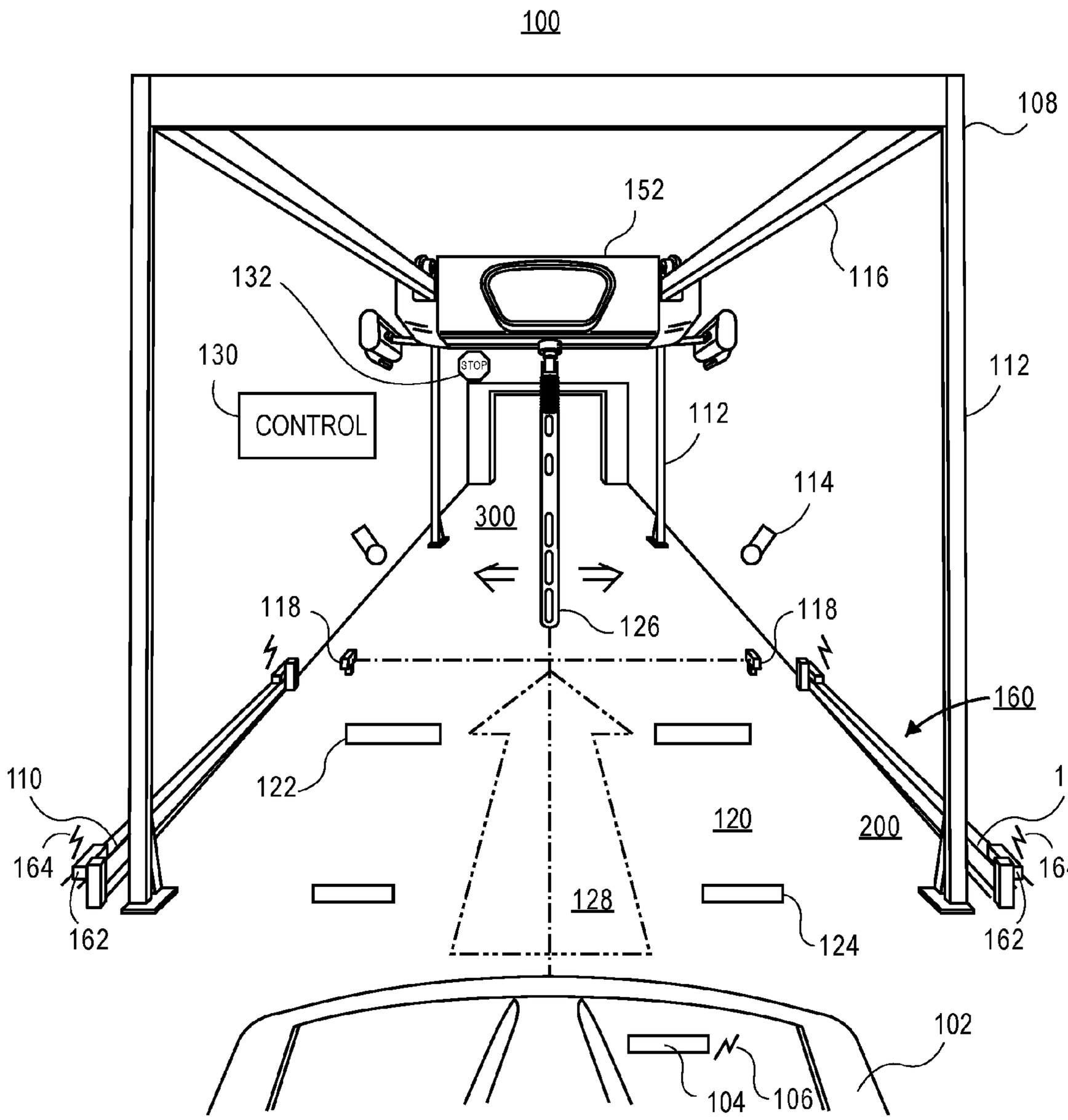
100
108
152
116
132
130
STOP
CONTROL
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112
114
300
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200
110
164
164
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104
106

FIG. 1

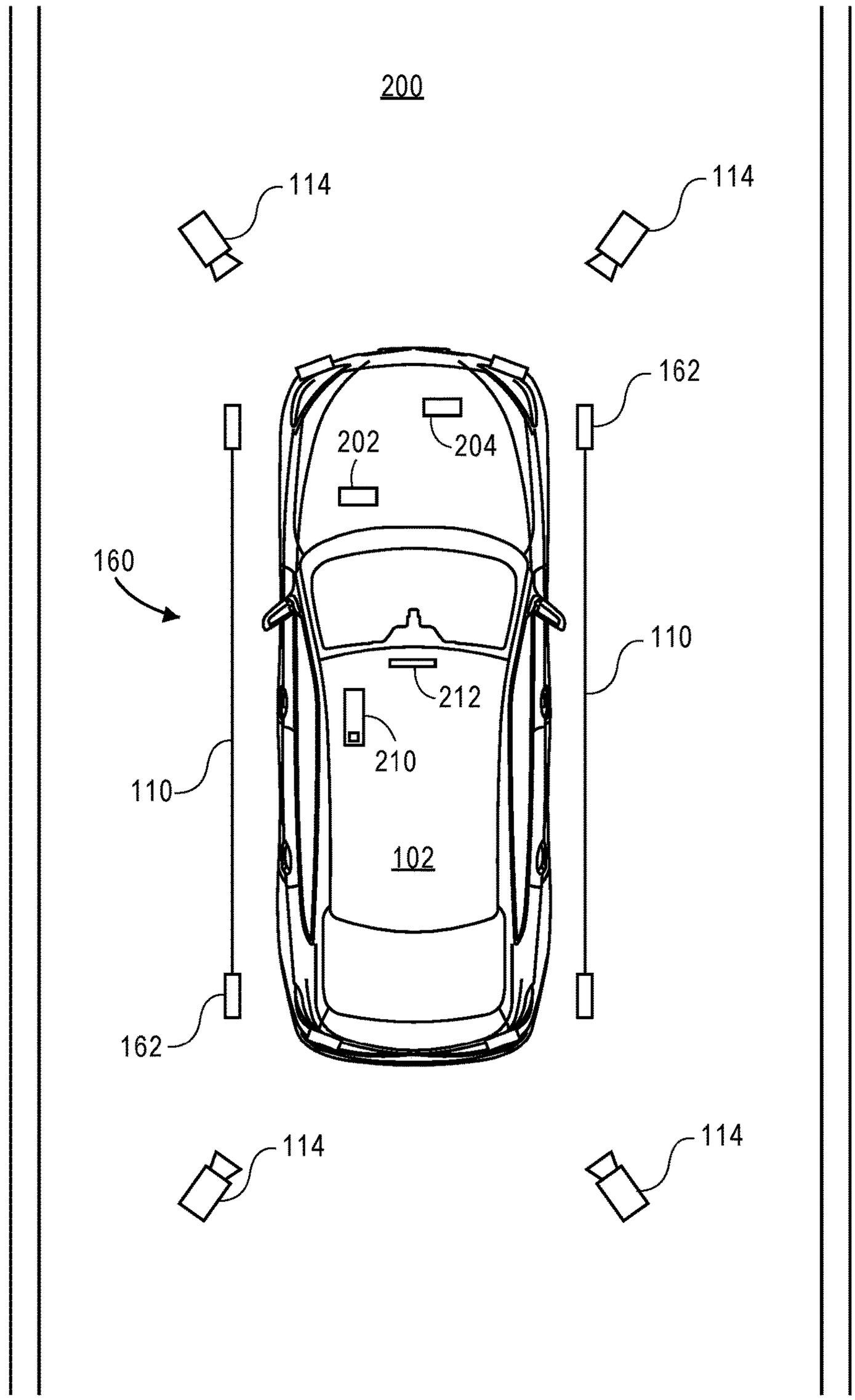

FIG. 2

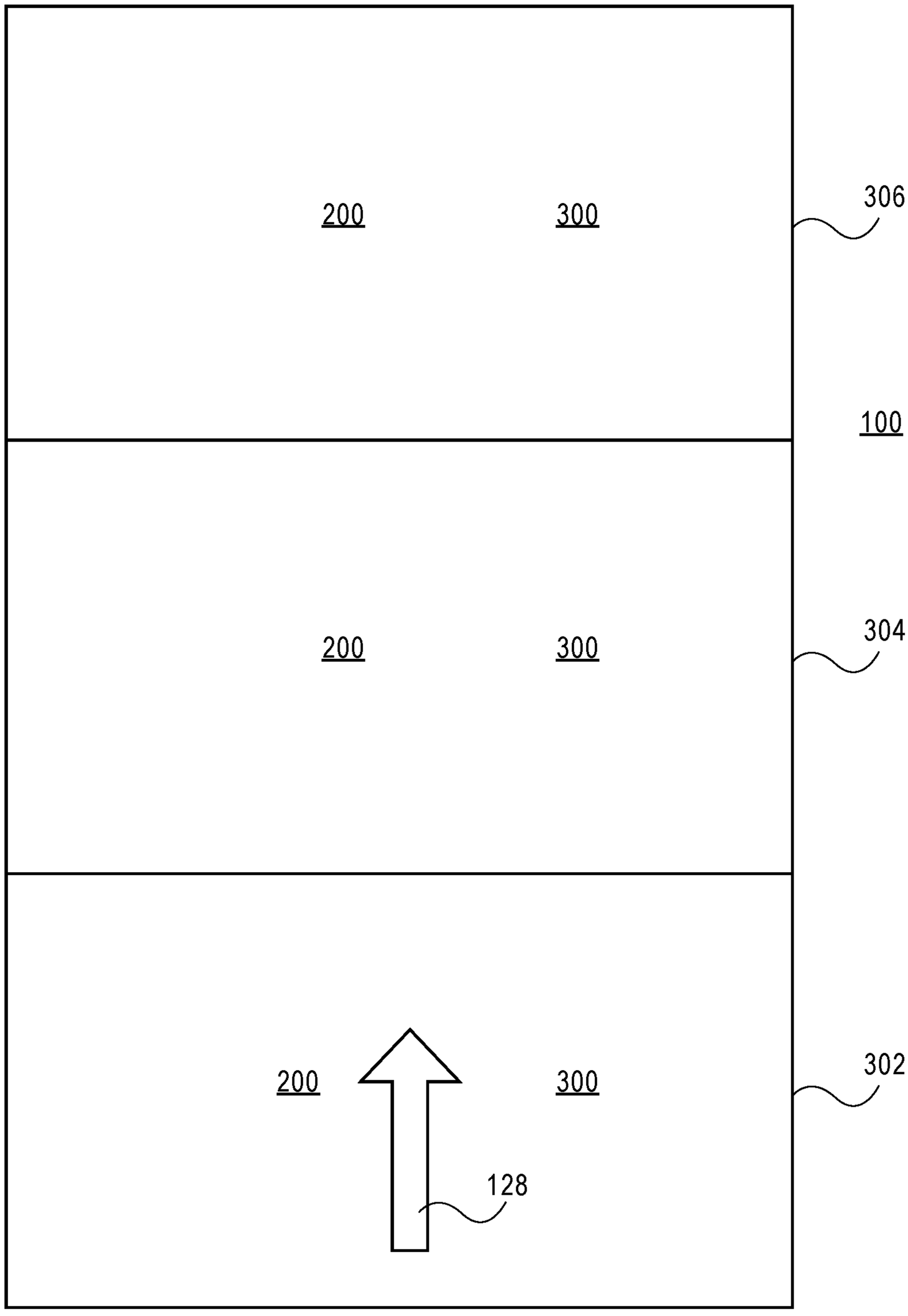

FIG. 3

CAR WASH WITH INTEGRATED VEHICLE DIAGNOSTICS

FIELD OF THE INVENTION

The present invention relates generally to a car wash system. More particularly, the present invention relates to a car wash system having integrated vehicle diagnostics.

BACKGROUND OF THE INVENTION

Vehicle owners take pride in the vehicles they own including spending time and money to clean and maintain their vehicles. Maintaining their vehicle is important to avoid costly repairs. For example, maintaining proper alignment of the tires will prevent the tires from wearing unevenly leading to early and costly replacement of the tires. However, vehicle owners typically will not bring a vehicle in for maintenance unless it's scheduled or that there is something wrong with the vehicle. For example, if the vehicle pulls to the right while being driven, then this will prompt the owner to bring in the vehicle for an alignment.

Further, owners will hand wash their cars at a self-service car wash or at a full-service car wash, which take time to complete. The time at the car wash may range from 15 minutes to an hour depending on whether hand washing or what type of service is being performed at the full-service car wash. At full-service car wash, the owner rides in the vehicle while it's being washed and simply sits still until the wash cycle is completed.

Accordingly, it is desirable to provide a car wash system that includes vehicle diagnostic capabilities to take advantage of the down time at the car wash.

SUMMARY OF THE INVENTION

The foregoing needs are met, to a great extent, by the present invention, wherein in one aspect of an apparatus is provided that in some embodiments include a car wash including capabilities of diagnosing the vehicle, such as wheel alignment, measuring tire pressures, performing safety inspection, emissions testing and performing vehicle diagnostics and the like while at the car wash.

A car wash, that includes a wash bay configured to wash and dry a connected vehicle, a diagnostic bay configured to perform various diagnostic functions including tire depth measurement and retrieving a set diagnostic trouble code from a connected vehicle's electronic control unit, and a control configured to receive the tire depth measurement and the set diagnostic trouble code, the control diagnoses the connected vehicle based on the received tire depth measurement and the set diagnostic trouble code, wherein the diagnosis is sent to a driver's wireless computing device.

A method of washing and performing a diagnostic test on a connected vehicle, that includes the steps of receiving the connected vehicle within the car wash, retrieving, via the connected vehicle's wireless computer system, a set diagnostic trouble code, receiving the set diagnostic trouble code at a control of the car wash, determining a diagnosis of the connected vehicle by the control based on the retrieved set diagnostic trouble code, determining a tread depth of a tire of the connected vehicle via a tire tread determination system, receiving the determined tread depth of the tire by the control, determining if the determined tread depth of the tire indicates that the tire needs an alignment, and sending the diagnosis of the connected vehicle and an indication that the tire needs to be aligned to a driver's wireless computing device.

A car wash, that includes, a wash bay configured to wash, dry and wax a connected vehicle, a diagnostic bay configured to perform various diagnostic functions including tire pressure interrogation to activate a tire sensor on a wheel of the connected vehicle, and emission testing by retrieving a set emission related diagnostic trouble code from a connected vehicle's electronic control unit, and a control configured to receive a tire pressure from the activated tire sensor and the set emissions related diagnostic trouble code, the control determines if the connected vehicle will pass or fail the emission test for a state based on the set emission related diagnostic trouble code, wherein the pass or fail determination is sent to a driver's wireless computing device.

There has thus been outlined, rather broadly, certain embodiments of the invention in order that the detailed description thereof herein may be better understood, and in order for the present contribution to the art may be better appreciated. There are, of course, additional embodiments of the invention that will be described below and which will form the subject matter of the claims appended hereto.

In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of embodiments in addition to those described and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein, as well as the abstract, are for the purpose of description and should not be regarded as limiting.

As such, those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a car wash with a connected vehicle according to an embodiment of the invention.

FIG. **2** is a top view of the connected vehicle positioned in the diagnostic bay of the car wash.

FIG. **3** illustrates various placements of the diagnostic bay in car wash.

DETAILED DESCRIPTION

The invention will now be described with reference to the drawing figures, in which like reference numerals refer to like parts throughout. An embodiment in accordance with the present invention provides a car wash facility that is capable of performing vehicle diagnostics while the vehicle is at the car wash. In some embodiments, before, during or after the car wash, vehicle diagnostics such as tire pressure monitoring, wheel alignment, other vehicle diagnostic including retrieving any set diagnostic trouble codes, and safety and emissions testing and the like may be performed. By performing these services at a car wash, vehicle diagnostic will be performed more often then simply when the

driver has an issue with the vehicle. Thus, potential damaging issues may be avoided if the issues with the vehicle are detected earlier. In other embodiments, the car wash may be located at a vehicle service center such as a Toyota or General Motors dealer so that any needed service may be performed on-site.

FIG. **1** illustrates a car wash **100** with a connected vehicle **102** according to an embodiment of the invention. The car wash **100** can be any type of car wash including ones with brush, cloth, touch-less and the like. Essentially, the car wash **100** is designed to receive vehicle, such as the connected vehicle **102** and the car wash includes diagnostic capabilities. Car wash **100** may include housing or frame **108** with additional rails **110**, **116** that run parallel to a floor **120** and uprights **112** that are generally perpendicular to the rails **110**, **116**. A wash bay **300** is provided to perform the wash and dry functionality of the car wash. A diagnostic bay **200** may include some or all of the components for the vehicle diagnostics and may be placed before, during or after the car wash.

The connected vehicle **102** includes a wireless computer system **104** that communicates with the various electronic control units of the vehicle in order to retrieve diagnostic information. The electronic control units (ECUs) may contain various software and hardware to provide certain diagnostic information such as set diagnostic trouble codes (DTCs) in the event that the ECU's detect a problem with the vehicle. The wireless computer system **104** may communicate via a wireless connection **106** to an external computing device, such as control **130** of the car wash **100**. The wireless connection **106** may communicate via RF (radio frequency), satellites, cellular phones (analog or digital), Bluetooth®, Wi-Fi, Infrared, ZigBee, Local Area Network (LAN), WLAN (Wireless Local Area Network), Wide Area Network (WAN), NFC (near field communication), other wireless communication configurations and standards, or a combination thereof.

In an alternative embodiment, if the connected vehicle **102** does not have any means to retrieve and transmit diagnostic trouble codes and diagnostic information, a wireless diagnostic tool and/or wireless battery tester may be given at the beginning of the car wash process and returned at the end of the wash. The wireless diagnostic tool **202** (FIG. **2**) may be the U-Scan™ and wireless battery tester may the Smart Battery Tester™ both from Bosch Automotive Service Solutions Inc., located in Warren Mich. The driver or wash personnel can connect the U-Scan™ to the vehicle's data link connector and the U-Scan™ can retrieve diagnostic information such as set DTCs in the vehicle or battery level. Additionally, the driver or wash personnel can also connect the Smart Battery Tester™ **204** to provide battery testing results. Both the wireless diagnostic tool **202** and battery tester **204** may transmit the diagnostic information and/or battery testing results to a remote computing device such as control **130** and/or the driver's wireless computing device **210** (FIG. **2**).

Floor **120** may include a tire tread determination system **122**, in which a tire tread may be determined based on various techniques such as light, imaging, sound, gauge and the like. The tire tread determination system **122** includes at least one tire sensor **124**, but may include 2 or more tire sensor **124**. In one embodiment, there is one tire sensor **124** configured and positioned to receive each tire of the connected vehicle **102**.

The tire tread determination system **122** is configured to measure a depth of a tire in order to determine whether the tire needs to be replaced. The connected vehicle's **102** information, such as a VIN number or tire identifying information can be entered into the control so that the proper tread depth information can be loaded onto the control **130** (further discussed below). Once the VIN or other vehicle/tire identification information is entered, the control **130** can load up a starting depth of a new tire to measure against the tire of the connected vehicle. Instructions to the driver, if needed, may be displayed on the display **132** of the car wash, a display (and/or voice) of sound system **212** (FIG. **2**) on the connected vehicle or on the wireless computing device **210**. Depending on the tire tread determination system **122** used, an energy signal such as sound, light and the like is emitted and returned to a sensor to measure the various depths of the tires. Once the measured depths information is gathered and compared against the starting depth of a new tire, then the control **130** can let the driver know whether the tire or tires need to be replaced and approximately how soon. Further, the measured depths information may also indicate that an alignment is needed or that the shocks need to be replaced.

In one embodiment, a report may be generated at the end of the car wash and handed to the driver and/or sent to the driver's wireless computing device **210**. Thus, if a tire's depth is too narrow to drive further, the driver can be alerted to this safety issue and can be directed to a nearby tire shop or a tow truck can be ordered.

Control **130** may include all the necessary diagnostic information such as parts needed, top fixes based on retrieved diagnostic information or DTCs, warranty information, service bulletins, recalls, and the like. The control **130** may include processors, memories, bus, wireless transceivers, software (operating system, vehicle diagnostic software, car wash software and the like), databases (parts, top fixes, diagnostic information, locations of service stations, parts stores) and the like in order to fully performed all the embodiments of the invention. Based on vehicle diagnostic and retrieved set DTCs, the control using the top fixes database can diagnose the vehicle including parts and services that may need to be performed and the urgency, if any, for the service to be performed and/or the parts to be replaced. In another embodiment, the control **130** may communicate with a remote database to retrieve other or similar information. Additionally, the battery tester may perform the battery tests (e.g. heavy load) on the battery to determine any issues (e.g. not holding charge, discharging too rapidly) with the battery.

Control **130** may also control the car wash functionality such as when to start the washing, drying and waxing process so that the car wash functionality does not interfere with the diagnostic capabilities. For example, the control **130** may not allow the wash function to start before the tire depth is being measured by light as water may interfere with the light being received by the light sensor of the tire tread determination system **122**.

In another embodiment, the report can be sent to a wireless computing device **210** of the driver. The wireless computing device may be a smart phone, a smart watch, smart glasses, a tablet, a lap top, a gaming console, a personal computer and the like. If the driver provides contact information, such as cell number, or email address to the car wash owner when purchasing a monthly or yearly pass or if a mobile pay service (e.g. PayPal™, Apple Pay™, Google Pay™) on the wireless computing device is utilized then contact information of the wireless computing device **210** such as mobile identification number, mobile subscription identification number, or unique device identifier and the like may also be provided to the car wash in order to receive the report on the wireless computing device **210**.

In still another embodiment, the vehicle's tire pressure sensors and/or the tire pressure monitoring system (TPMS) of the vehicle may be integrated while at the car wash **100** via a tire integrator system **160**. The tire integrator system **160** includes tire integrator **162** that communicate via a wireless connection **164**. The tire integrator **162** may be mounted on rails **110** and may be manually adjustable or automatically adjustable via micro motors installed on the tire integrator **162**. The movement of the micro motors may be controlled by control **130** so that proper interrogation of the vehicle's tire pressure sensors or TPMS system by the tire integrator **162** is accomplished. That is some tire pressure sensors may require the tire integrator **162** to be in close proximately in order to interrogate the tire pressure sensors and thus adjustments may be needed for variety of vehicles (e.g. sedan, truck).

Upon activation of the tire pressure sensors or the TPMS, the various information of the tires may be received by control **130** including tire pressure, ID of the tire pressure sensors and on which tires each of the sensors are located in relation to the vehicle, battery or power remaining on the tire sensors and the like. The vehicle information may have been previously provided to the control **130** or the tire integrator system **160** may automatically interrogate the tire sensors or TPMS using various different communication means until a return signal is received. For example, ultra high frequency such as 434 MHz or 315 MHz may be sent to the tire sensors. If manual activation through a magnet is required, then a car wash technician or even the driver may be instructed to place the magnet near each tire sensors for activation of the sensor in order to send the tire information to the control **130**.

In a further embodiment, a partial safety inspection including an emission inspection may also be performed at the car wash **100**. Emission inspection includes querying the ECUs of the vehicle for any emissions related issues and any set emissions related DTCs. As noted herein, DTCs and diagnostic information may be transmitted via the connected vehicle **102** through the wireless computer system **104** or via the wireless diagnostic tool **202**. Thus, emissions testing may be conducted at the car wash **100**. The control receives any set emission related DTC to determine if the vehicle can pass inspection for that particular state in which the car wash is located. The control can access its database to help make this determination and send the report to the driver's wireless computing device.

Additionally, cameras **114** (or photocells) and a beam light bar **126** may properly positioned to determine whether lights on the connected vehicle **102** are working in order to pass the safety inspection. The beam light bar **126** may be moved left to right and up and down in relation to arrow **128** to accommodate different positions of headlights in a sedan versus a truck. Movement of the beam light bar **126** may be facilitated by equipment array **152** having micro motors, known in the art, to provide said movements. The beam light bar **126** may detect if the headlights are misaligned. Further, the cameras may also provide proof to state inspection facilities that the lights on the vehicle are working properly or be displayed to the driver that a light is out. The vehicle's lights may include, turn lamps, headlights, back up lights, brake lights, license plate lights and the like. Although safety inspection may not be fully performed in the car wash, it may be completed right outside the car wash by an inspector for the remainder of the safety inspection and thus, saving time for the driver. Additionally, the driver may have an opportunity to fix any issues before paying for a full inspection as often inspection facilities will not provide a partial refund for failed inspections. Instructions to the driver, if needed, to turn on or activate certain lights may be displayed on the display **132** of the car wash, a display **212** (or voice) on the connected vehicle or on the wireless computing device **210**.

Floor **120** also includes vehicle sensor **118** that senses the presence of the connected vehicle. Once the vehicle sensor **118** is detect the presence of the connected vehicle, the typical car wash functionality may start, such as washing, waxing, drying and the like. The car wash functionality may be performed in wash section **300** of the car wash **100**. The one or more of diagnostic functions of the car wash **100** may be performed before the connected vehicle **102** reaches the vehicle sensor **118** or be performed after the connected vehicle finishes the typical car wash functions.

FIG. **2** is a top view of the connected vehicle **102** positioned in the diagnostic bay **200** of car wash **100**. In one embodiment, the diagnostic bay may be placed before the actual car wash functions are started. In another embodiment, the diagnostic bay **200** may be placed after the car wash functions are completed or mostly completed. In still another embodiment, the diagnostic bay **200** may be placed during the car wash functions. Each of the various diagnostic capabilities discussed herein may be located in one diagnostic bay (i.e. before car wash functionality) or may be spread out (i.e. before car wash and after car wash functionality) depending on the design of the car wash. While in the diagnostic bay, the tire depth can be measured as discussed herein.

Tire pressure and TPMS systems may be interrogated by the tire integrator system **160**, which includes the tire integrator **162** located near or on the ends of rail **110**. As previously discussed the tire integrator **162** may be moved by micro motors (controlled by control **130**) to which the tire integrator **162** are mounted to or be manually moved along the rail **110** in order to be positioned near the tire sensors and/or TPMS system.

Cameras **114** or photocells may be mounted in the car wash, for example on upright **112**, to view the front and back of the connected vehicle **102** in order to perform a partial safety inspection. The driver may be instructed (via display or voice) to turn on the lights, turn on blinkers or brake lights and the like while in the diagnostic bay in order to perform the safety inspection. The remaining safety inspection may be performed upon exiting the car wash or done previous to entering the car wash. In one embodiment, the remaining portion of the safety inspection is done after a determination that all of the lights are working properly so that a full inspection fee is not paid in the event of a non-working light bulb.

The connected vehicle **102** may include the wireless computing system **104** and/or a wireless diagnostic tool **202** may be provided to the driver upon entering the car wash **100** in order to conduct diagnostic on the connected vehicle including retrieving any set DTCs. Further, instructions or diagnostic reports (from various diagnostic tests conducted in the diagnostic bay) to the driver may be sent to the display **212** in the vehicle and/or to the driver's wireless computing device **210**.

Battery tester **204** may also be provided to the driver or placed near the battery by the car wash technician. Then the battery tests may be conducted and the results of the test may be wireless sent to the control **130** or the driver's wireless computing device **210**. At the control **130**, warranty information about the battery or recall information may be retrieved from databases and sent to the driver. Further control **130** may also receive the battery test information and

run additional diagnostic on the data sent by the battery tester **204**. The battery information may be previously entered into the control **130** or the battery bar code scanned, for example, by the driver's wireless computing device **210**.

FIG. **3** illustrates various placements of the diagnostic bay **200** in car wash **100**. Arrow **128** indicates the direction and where the connected vehicle **102** could enter the car wash **100**. Depending on the desired configurations and diagnostic tests offered at the car wash, the diagnostic bay **200** may be placed in the first third **302** of the car wash **100**, the second third **304** or middle of the car wash **100** and/or last third **306** of the car wash **100**. Any combination or all of the diagnostic capabilities that are available may be in one or more of the diagnostic bay **200** and in one or more thirds (**302**, **304**, **306**) of the car wash **100**. That is, in diagnostic bay **200** of first third **302**, the tire depth measurement may be conducted. Then in the second third, the wireless computing system **104** and/or a wireless diagnostic tool **202** may interrogate the vehicle ECUs to retrieve any DTCs or diagnose issues with the connected vehicle **102**. In the last third **306**, the diagnostic bay may include the tire integrator system **160** to interrogate tire sensors or TMPS and the cameras for the safety inspection may be positioned to view lights on the connected vehicle **102**.

The wash section **300** of the car wash **100** may be positioned in the first (**302**), second (**304**) and/or last third (**306**) of the car wash depending on the configuration desired by the owner. Certain wash function such as washing with liquid may interfere with certain tests such as tire depth and thus, it may not be desirable to place the wash section **300** where tire depth measurement is conducted. However, the car wash functions may be spread out throughout the car wash so that the desired configuration of car wash functions and the diagnostic capabilities are synergistic with each other or don't interfere with each other.

It should also be noted that the software implementations of the invention as described herein can be stored on a tangible, non-transitory storage medium, such as: a magnetic medium such as a disk or tape; a magneto-optical or optical medium such as a disk; or a solid state medium such as a memory card or other package that houses one or more read-only (non-volatile) memories, random access memories, or other re-writable (volatile) memories. Accordingly, the invention is considered to include a tangible storage medium or distribution medium, as listed herein and including art-recognized equivalents and successor media, in which the software implementations comprising code segments are stored. Additionally, although a diagnostic tool is described herein, the invention may be implemented on any computing device such as a personal computer, notebook, smart phone, a tablet and the like.

The many features and advantages of the invention are apparent from the detailed specification, and thus, it is intended by the appended claims to cover all such features and advantages of the invention, which fall within the true spirit, and scope of the invention. Further, since numerous modifications and variations will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation illustrated and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed is:

1. A car wash, comprising:

a wash bay configured to wash and dry a connected vehicle;

a diagnostic bay configured to perform various diagnostic functions including tire depth measurement, tire pressure monitoring, and retrieving a set diagnostic trouble code from a connected vehicle's electronic control unit, the diagnostic bay further configured to include a camera that captures images of a light of the connected vehicle to perform a safety inspection of the connected vehicle, the diagnostic bay further includes a tire interrogator mounted on rails, and the diagnostic bay further includes a beam light bar configured to be positioned to detect if the light on the connected vehicle, the beam light bar being movable via micro motors; and

a controller configured to receive the tire depth measurement, tire pressure, images from the camera, and the set diagnostic trouble code, the controller controls micro motors to adjust the tire interrogator, the controller diagnoses the connected vehicle based on the received tire depth measurement, tire pressure, and the set diagnostic trouble code, wherein a diagnosis is sent to a driver's wireless computing device, and wherein instructions to a driver to turn on a light of the connected vehicle as part of a safety inspection is displayed on a display of the connected vehicle; and wherein the controller is further configured to control a start of washing, and drying process of the wash bay so as to not interfere with the diagnostic functions of the diagnostic bay.

2. The car wash of claim **1** further comprising a wireless battery tester that conducts a battery test when connected to a vehicle's battery and sends results of the battery test wirelessly to the driver's wireless computing device or the controller.

3. The car wash of claim **1**, the controller is configured to receive a battery test via a wireless battery tester that is connected to the connected vehicle's battery.

4. The car wash of claim **1**, wherein the diagnostic bay is positioned before the wash bay so that the wash does not interfere with the diagnostic functions of the diagnostic bay.

5. The car wash of claim **1**, wherein the diagnostic functions include the safety inspection.

6. The car wash of claim **1**, wherein the diagnostic functions include an emission inspection.

7. The car wash of claim **6**, wherein the emission inspection includes retrieving a set emissions related diagnostic trouble code.

8. The car wash of claim **1**, wherein the diagnostic bay is positioned after the wash bay so that the wash does not interfere with the diagnostic functions of the diagnostic bay.

9. The car wash of claim **1**, wherein the diagnosis further includes top fixes, parts and services and an urgency of the services based on the set diagnostic trouble code.

10. A method of washing and performing a diagnostic test on a connected vehicle, comprising the steps of:

receiving the connected vehicle in a car wash, the car wash comprising a diagnostic bay and a wash section;

retrieving a tire pressure and sensor identification of a tire of the connected vehicle with a tire pressure monitoring system having a tire interrogator mounted on rails and positioned within the diagnostic bay of the car wash;

sending the retrieved tire pressure and sensor identification to a controller of the car wash, and the controller controlling micro motors to adjust the tire interrogator;

retrieving, via a connected vehicle's wireless computer system, a set diagnostic trouble code;

receiving the set diagnostic trouble code at the controller of the car wash;

determining a diagnosis of the connected vehicle by the controller based on the retrieved set diagnostic trouble code;

displaying, on a display of the connected vehicle, instructions to a driver of the connected vehicle to turn on a light for an inspection test;

detecting the light on the connected vehicle with a beam light bar positionable by micro motors controlled by the controller;

capturing an image of the turned-on light of the connected vehicle with a camera positioned in the car wash;

controlling a car wash functionality with the controller of the car wash to not allow a wash function to start before measuring a tread depth of a tire;

determining the tread depth of the tire of the connected vehicle via a tire tread determination system;

receiving the determined tread depth of the tire by the controller;

determining if the determined tread depth of the tire indicates that the tire needs an alignment;

sending the diagnosis of the connected vehicle and an indication if the tire needs to be aligned to a driver's wireless computing device;

displaying on the display of the driver's wireless computing device the indicator and the diagnosis; and

washing the connected vehicle after the sending the diagnosis.

11. A car wash, comprising:

a wash bay configured to wash, dry and wax a connected vehicle;

a diagnostic bay configured to perform various diagnostic functions including tire pressure interrogation to activate a tire sensor on a wheel of the connected vehicle, and emission testing by retrieving a set emission related diagnostic trouble code from a connected vehicle's electronic control unit;

the diagnostic bay further configured to include a camera that captures images of a light of the connected vehicle to perform a safety inspection of the connected vehicle, the diagnostic bay further includes a tire interrogator mounted on rails, and the diagnostic bay further includes a beam light bar configured to be positioned to detect the light on the connected vehicle, the beam light bar being movable via micro motors; and

a controller configured to receive a tire pressure from the activated tire sensor, images from the camera, and the set emissions related diagnostic trouble code, the controller controls micro motors to adjust the tire interrogator, the controller determines if the connected vehicle will pass or fail an emission test for a state based on the set emission related diagnostic trouble code,

wherein a pass or fail determination is sent to a driver's wireless computing device, and wherein instructions to a driver to turn on a light of the connected vehicle as part of a safety inspection is displayed on a display of the connected vehicle, and

wherein the controller is further configured to control a start of washing, and drying process of the wash bay so as to not interfere with the diagnostic functions of the diagnostic bay.

12. The car wash of claim **11** further comprising a wireless battery tester that conducts a battery test when connected to a vehicle's battery and sends results wirelessly to the driver's wireless computing device or the controller.

13. The car wash of claim **11**, the controller is configured to receive a battery test via a wireless battery tester that is connected to the connected vehicle's battery.

14. The car wash of claim **11**, wherein the diagnostic bay is positioned before the wash bay so that the wash does not interfere with the diagnostic functions of the diagnostic bay.

15. The car wash of claim **11**, wherein the diagnostic functions include a safety inspection.

16. The car wash of claim **11**, wherein the diagnostic bay is positioned after the wash bay so that the wash does not interfere with the diagnostic functions of the diagnostic bay.

17. The car wash of claim **11**, wherein the diagnostic functions also include tire depth measurement via a tire tread determination system.

18. The car wash of claim **11**, wherein a contact information for the driver's wireless computing device is provided when a mobile pay system on the driver's wireless computing device is used to pay for a car wash.

19. The car wash of claim **11**, wherein the diagnosis further includes top fixes, parts and services and an urgency of the services based on the set diagnostic trouble code.

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